

The demand must be filed directly with the competent International Preliminary Examining Authority or, if two or more Authorities are competent, with the one chosen by the applicant. The full name or two-letter code of that Authority may be indicated by the applicant on the line below:

IPEA/ KR

PCT

CHAPTER II

DEMAND

under Article 31 of the Patent Cooperation Treaty:
The undersigned requests that the international application specified below be the subject of international preliminary examination according to the Patent Cooperation Treaty.

For International Preliminary Examining Authority use only	
Identification of IPEA	Date of receipt of DEMAND
Box No. I IDENTIFICATION OF THE INTERNATIONAL APPLICATION Applicant's or agent's file reference OP04-1091	
International application No. PCT/KR2005/000045	International filing date (day/month/year) 07 JANUARY 2005 (07.01.2005) (Earliest) Priority date (day/month/year) 08 JANUARY 2004 (08.01.2004)
Title of invention METHOD AND COMPOSITION FOR TREATING ACNE USING LIGNAN COMPOUNDS	
Box No. II APPLICANT(S)	
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.) HWANG, Jae-Kwan Dahlvit maeul Apt. #109-604, 858 Hwajeong-dong, Deokyang-gu, Goyang, Gyeonggi-do 412-270 Republic of Korea	
Telephone No. 82-2-2123-5881	
Facsimile No. 82-2-362-7265	
Teleprinter No.	
Applicant's registration No. with the Office	
State (that is, country) of nationality: KR	State (that is, country) of residence: KR
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.) NEWTREE INDUSTRY Co., LTD Bundang Technopark #D-902, 151 Yatap-dong, Bundang-gu, Sungnam, Gyeonggi-do 463-070 Republic of Korea	
State (that is, country) of nationality: KR	
State (that is, country) of residence: KR	
Name and address: (Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.) CHUNG, Jae-Youn Jinheung Apt. #3-1006, Seocho 4-dong, Seocho-gu, Seoul 137-776 Republic of Korea	
State (that is, country) of nationality: KR	
State (that is, country) of residence: KR	
<input checked="" type="checkbox"/> Further applicants are indicated on a continuation sheet.	

Sheet No. .2

International application No.
PCT/KR2005/000045

Continuation of Box No. II APPLICANT(S)

*If none of the following sub-boxes is used, this sheet should not be included in the demand.*Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)*

CHUNG, Hee-Chul
Poongrim Apt. #302-1502,
Seongjeo maeul, Daehwa-dong, Ilsan-gu,
Goyang,
Gyeonggi-do 411-703
Republic of Korea

State *(that is, country)* of nationality:
KRState *(that is, country)* of residence:
KRName and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)*

PARK, Kyung-Min
Jakeungoongjeon Apt. #101,
167-8 Sam-dong, Gwangju,
Gyeonggi-do 464-805
Republic of Korea

State *(that is, country)* of nationality:State *(that is, country)* of residence:Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)*State *(that is, country)* of nationality:State *(that is, country)* of residence:Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)*State *(that is, country)* of nationality:State *(that is, country)* of residence:☐ Further applicants are indicated on another continuation sheet.

Sheet No. .3

International application No.
PCT/KR2005/000045**Box No. III AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCE**

The following person is ☒ agent ☐ common representative
 and ☒ has been appointed earlier and represents the applicant(s) also for international preliminary examination.
☐ is hereby appointed and any earlier appointment of (an) agent(s)/common representative is hereby revoked.
☐ is hereby appointed, specifically for the procedure before the International Preliminary Examining Authority, in addition to the agent(s)/common representative appointed earlier.

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)*

KIM, Seog-Hyun
 9th Floor, Daekyung Building,
 120, 2-ka, Taepyung-ro, Chung-ku,
 Seoul 100-724
 Republic of Korea

Telephone No.

82-2-772-2786

Facsimile No.

82-2-772-2800

Teleprinter No.

Agent's registration No. with the Office

☐ Address for correspondence: Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.

Box No. IV BASIS FOR INTERNATIONAL PRELIMINARY EXAMINATION**Statement concerning amendments:***

1. The applicant wishes the international preliminary examination to start on the basis of:

☒ the international application as originally filed

the description ☐ as originally filed

☒ as amended under Article 34

the claims ☐ as originally filed

☐ as amended under Article 19 (together with any accompanying statement)

☒ as amended under Article 34

the drawings ☒ as originally filed

☐ as amended under Article 34

2. ☐ The applicant wishes any amendment to the claims under Article 19 to be considered as reversed.

3. ☐ Where the IPEA wishes to start the international preliminary examination at the same time as the international search in accordance with Rule 69.1(b), the applicant requests the IPEA to postpone the start of the international preliminary examination until the expiration of the applicable time limit under Rule 69.1(d).

4. ☐ The applicant expressly wishes the international preliminary examination to start earlier than at the expiration of the applicable time limit under Rule 54bis.1(a).

* Where no check-box is marked, international preliminary examination will start on the basis of the international application as originally filed or, where a copy of amendments to the claims under Article 19 and/or amendments of the international application under Article 34 are received by the International Preliminary Examining Authority before it has begun to draw up a written opinion or the international preliminary examination report, as so amended.

Language for the purposes of international preliminary examination: English

☐ which is the language in which the international application was filed.

☐ which is the language of a translation furnished for the purposes of international search.

☒ which is the language of publication of the international application.

☐ which is the language of the translation (to be) furnished for the purposes of international preliminary examination.

Box No. V ELECTION OF STATES

The filing of this demand constitutes the election of all Contracting States which are designated and are bound by Chapter II of the PCT.

Sheet No. . . 4

International application No.
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Box No. VI CHECK LIST

The demand is accompanied by the following elements, in the language referred to in Box No. IV, for the purposes of international preliminary examination:

1. translation of international application : sheets
2. amendments under Article 34 : 6 sheets
3. copy (or, where required, translation) of amendments under Article 19 : sheets
4. copy (or, where required, translation) of statement under Article 19 : sheets
5. letter : sheets
6. other (specify) : sheets

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received not received

- | | |
|--------------------------|--------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> |
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| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |

The demand is also accompanied by the item(s) marked below:

- | | |
|--|---|
| 1. <input checked="" type="checkbox"/> fee calculation sheet | 5. <input type="checkbox"/> statement explaining lack of signature |
| 2. <input type="checkbox"/> original separate power of attorney | 6. <input type="checkbox"/> sequence listing in electronic form |
| 3. <input type="checkbox"/> original general power of attorney | 7. <input type="checkbox"/> tables in electronic form related to a sequence listing |
| 4. <input type="checkbox"/> copy of general power of attorney; reference number, if any: | 8. <input type="checkbox"/> other (specify): |

Box No. VII SIGNATURE OF APPLICANT, AGENT OR COMMON REPRESENTATIVE

Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the demand).

KIM, Seog-Hyun(Seal)

For International Preliminary Examining Authority use only

1. Date of actual receipt of DEMAND:

2. Adjusted date of receipt of demand due
to CORRECTIONS under Rule 60.1(b):

3. ☐ The date of receipt of the demand is AFTER the expiration of 19 months from the priority date and item 4 or 5, below, does not apply.
☐ The applicant has been informed accordingly.
4. ☐ The date of receipt of the demand is WITHIN the time limit of 19 months from the priority date as extended by virtue of Rule 80.5.
5. ☐ Although the date of receipt of the demand is after the expiration of 19 months from the priority date, the delay in arrival is EXCUSED pursuant to Rule 82.

6. ☐ The date of receipt of the demand is AFTER the expiration of the time limit under Rule 54bis.1(a) and item 7 or 8, below, does not apply.
7. ☐ The date of receipt of the demand is WITHIN the time limit under Rule 54bis.1(a) as extended by virtue of Rule 80.5.
8. ☐ Although the date of receipt of the demand is after the expiration of the time limit under Rule 54bis.1(a), the delay in arrival is EXCUSED pursuant to Rule 82.

For International Bureau use only

Demand received from IPEA on:

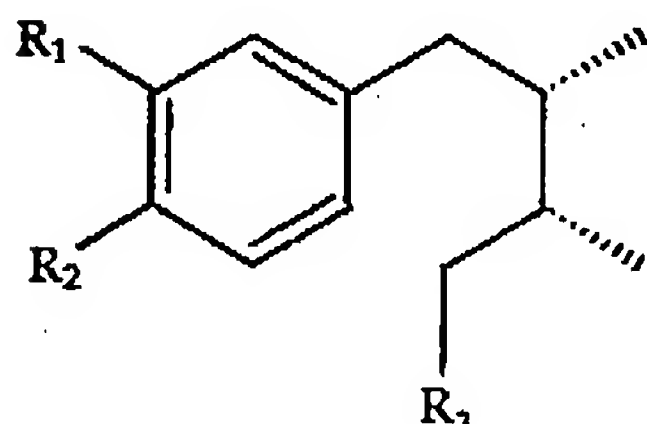
AP20 Rec'd PCT/PTO 06 JUL 2006

Technical Solution

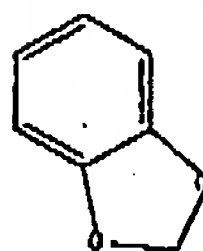
- [10] It is an object of the present invention to provide lignan compounds represented by Formula 1, which show antibacterial activity against acne-causing bacteria, as well as an antibacterial composition against acne-causing bacteria and a composition for treating acne.
- [11] Another object of the present invention is to provide methods for inhibiting the growth of acne-causing bacteria and for treating acne, which comprise administering lignan compounds represented by Formula 1 to a subject in need thereof.
- [12] Still another object of the present invention is to provide the uses of lignan compounds represented by Formula 1 for preparing antibacterial agents against acne-causing bacteria and for preparing acne treatment agent.
- [13] To achieve the above objects, in one aspect, the present invention provides an antibacterial composition and an acne treatment composition, which contain lignan (2,3-dibenzylbutane) compounds represented by Formula 1 or their pharmaceutically acceptable salts, which have antibacterial activity against acne-causing bacteria selected from the group consisting of *Propionibacterium acnes*, *Staphylococcus aureus*, and *Staphylococcus epidermis*.

[14] [Formula 1]

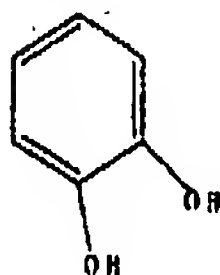
[15]



- [16] wherein each of R_1 and R_2 independently represents a C_{1-5} alkoxy group or a hydroxyl group, and R_3 represents



or



[17]

- [18] In another aspect, the present invention provides a method for inhibiting the growth

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of acne-causing bacteria selected from the group consisting of *Propionibacterium acnes*, *Staphylococcus aureus* and *Staphylococcus epidermis*, and a method for treating acne, in which each of the methods comprises administering an effective amount of lignan compounds represented by Formula 1 to a subject in need thereof.

[19] In another aspect, the present invention provides the uses of lignan compounds represented by Formula 1 for preparing antibacterial agents against acne-causing bacteria selected from the group consisting of *Propionibacterium acnes*, *Staphylococcus aureus*, and *Staphylococcus epidermis*, and for preparing acne treatment agents.

[20] As used herein, the term "effective amount" means the amount of the inventive lignan compounds, which is sufficient to show antibacterial activity against a acne-causing bacteria in a subject so as to allow effective treatment of acne.

[21] As used herein, the term "subject" means mammals, particularly animals including human beings. The subject may be patients requiring treatment.

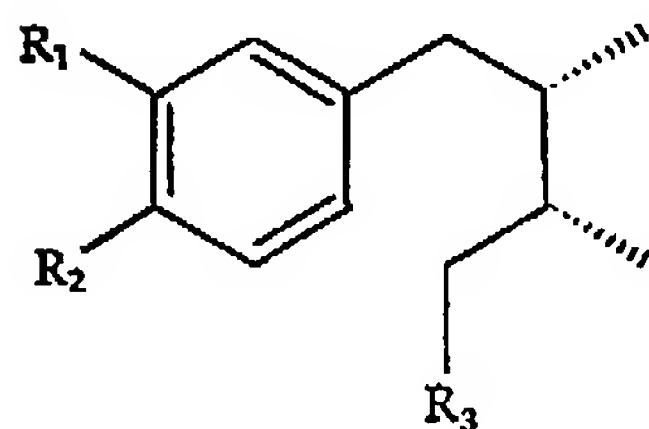
[22] Hereinafter, the present invention will be described in detail.

[23] The present invention is characterized by providing the antibacterial use of lignan compounds represented by Formula 1, against acne-causing bacteria.

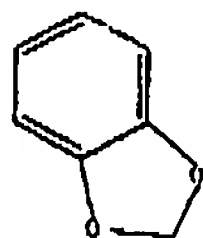
[24] The lignan compounds according to the present invention are represented by Formula 1 below:

[25] [Formula 1]

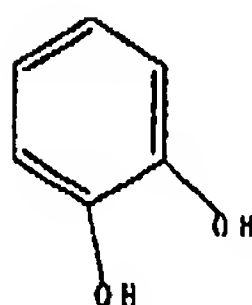
[26]



[27] wherein each of R₁ and R₂ independently represents a C₁₋₃ alkoxy group or a hydroxyl group, and R₃ represents



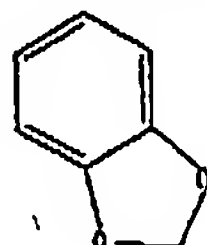
or



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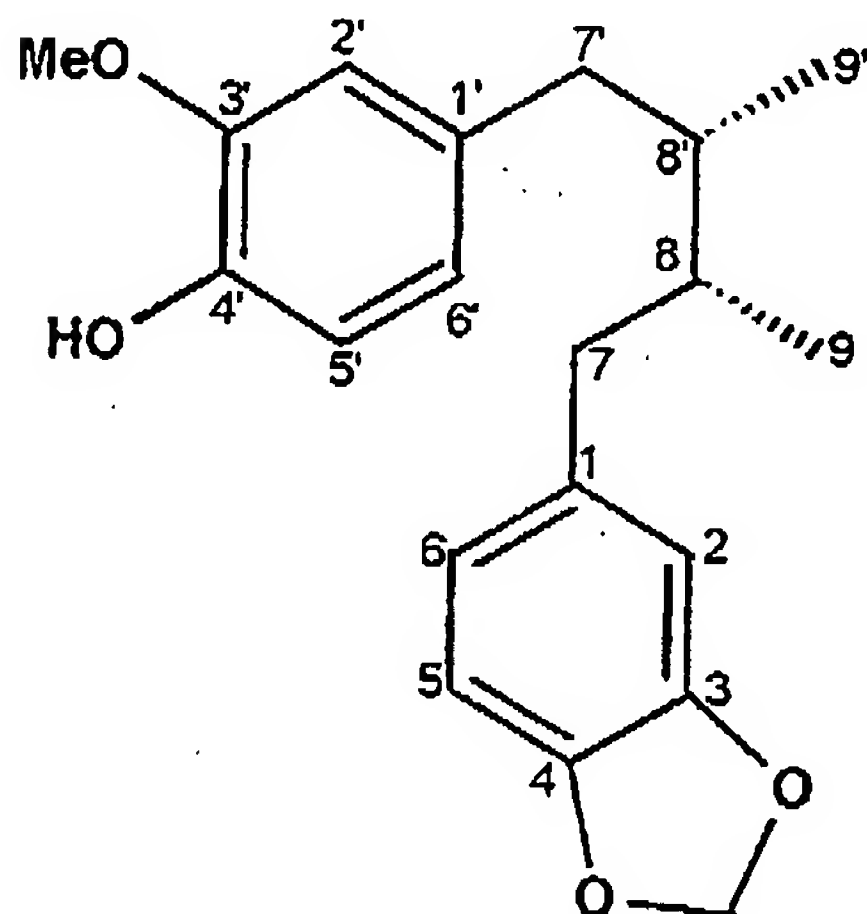
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- [28] A preferred example of the lignan compounds according to the present invention may be macelignan [(8R, 8'S)-7-(3,4-methylenedioxyphenyl)-7'(4-hydroxy-3-methoxyphenyl)-8,8'dimethylbutane]] represented by Chemical Formula 1 below wherein R_1 in Formula 1 represents a methoxy group, R_2 represents a hydroxyl group, and R_3 represents



[29] [Chemical Formula 1]

[30]



[31]

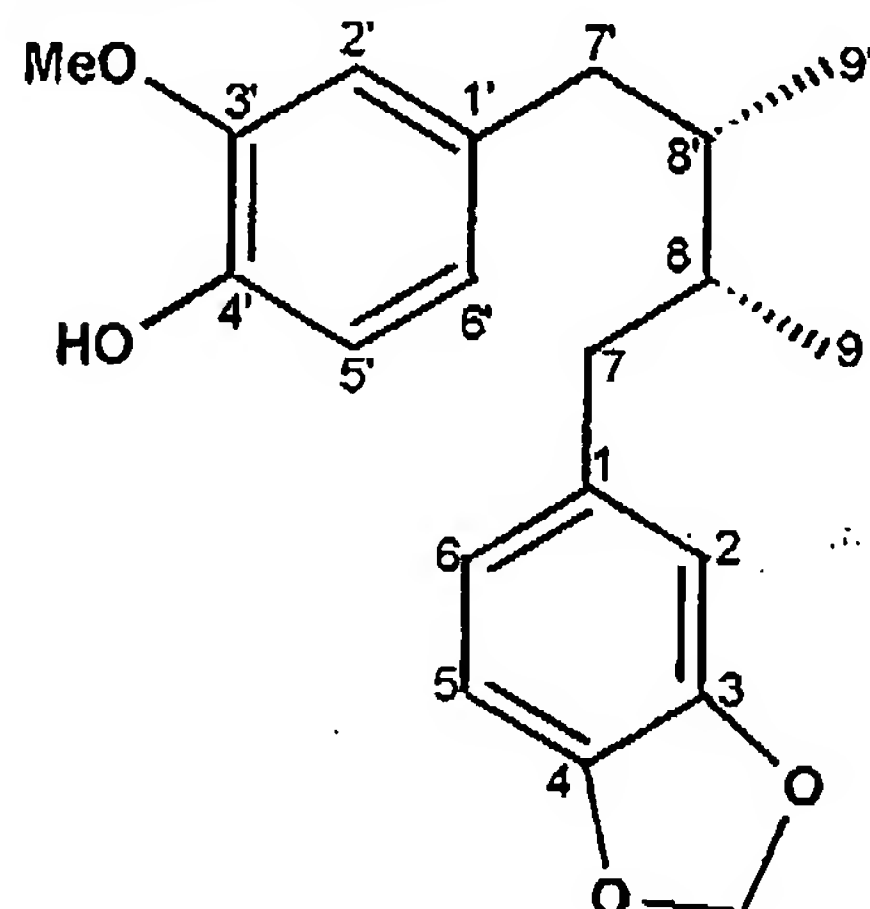
- [32] The inventive lignan compounds may be used in the form of salts, and preferably, pharmaceutically acceptable salts. It is desirable that these salts formed are pharmaceutically acceptable acid addition salts with free acids. As the free acids, organic acids and inorganic acids may be used. Examples of the organic acids include, but are not limited to, citric acid, acetic acid, lactic acid, tartaric acid, maleic acid, fumaric acid, formic acid, propionic acid, oxalic acid, trifluoroacetic acid, benzoic acid, gluconic acid, meta-sulfonic acid, glycolic acid, succinic acid, 4-toluenesulfonic acid, glutamic acid, and aspartic acid. In addition, the examples of the organic acids include, but are not limited to, hydrochloric acid, bromic acid, sulfuric acid, and phosphoric acid.

- [33] The inventive lignan compounds can be obtained from plants or their parts by the prior extracting method and isolating method. To obtain the desired extracts, the stems, roots or leaves are either suitably dehydrated and macerated, or simply dehydrated. The desired extracts are then purified by any purification method known to the persons skilled in the art. Moreover, the synthetic compounds or their derivatives cor-

Claims

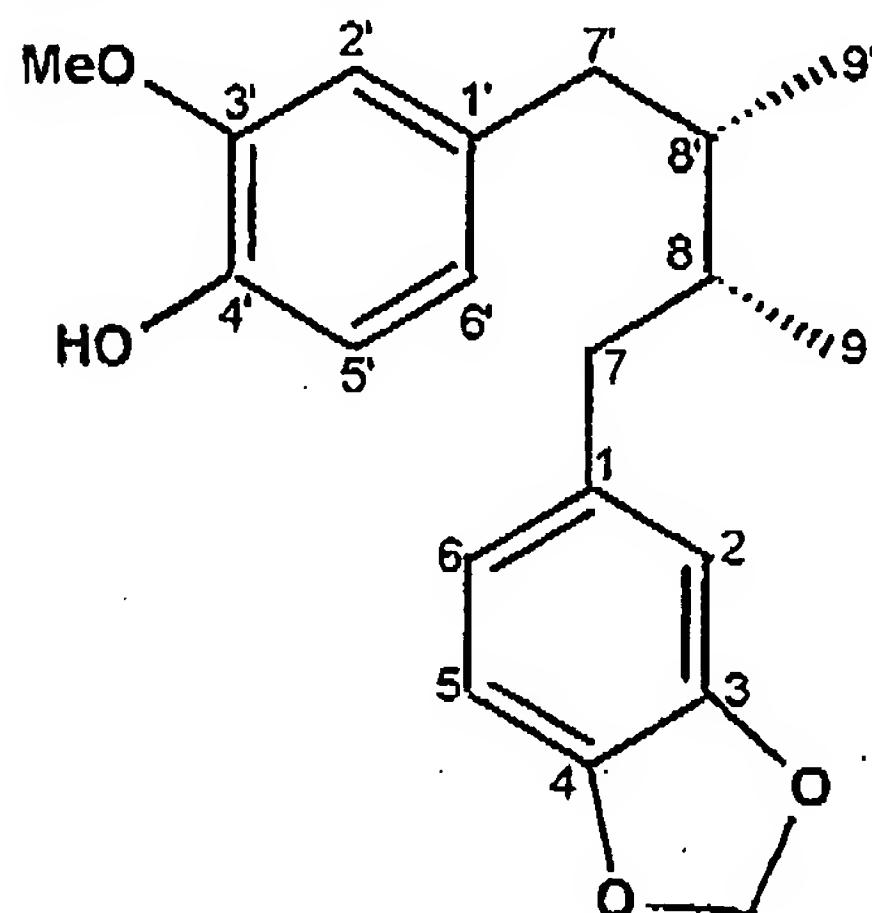
- [1] (Amended) An antibacterial composition against acne-causing bacteria selected from the group consisting of *Propionibacterium acnes*, *Staphylococcus epidermis* and *Staphylococcus aureus*, the composition comprising macelignan represented by Chemical formula 1 or its pharmaceutically acceptable salts:

[Chemical formula 1]



- [2] (Amended) A composition for treating acne, comprising macelignan compound represented by Chemical formula 1 or its pharmaceutically acceptable salts:

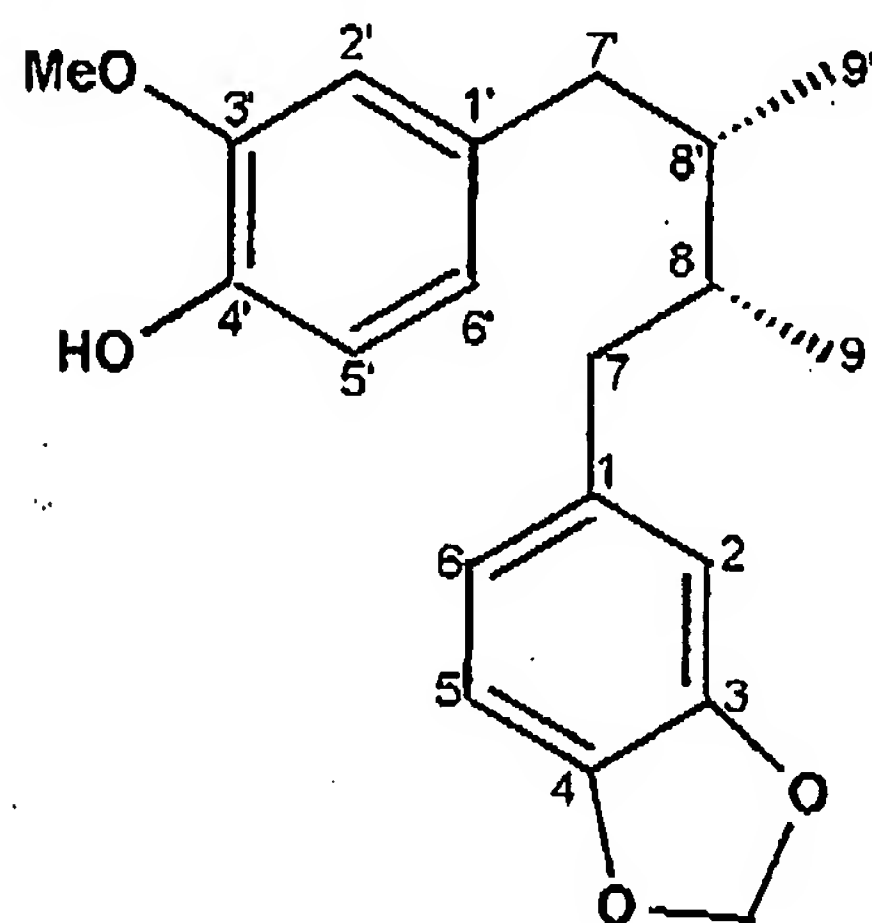
[Chemical formula 1]



- [3] (Cancelled) ✓

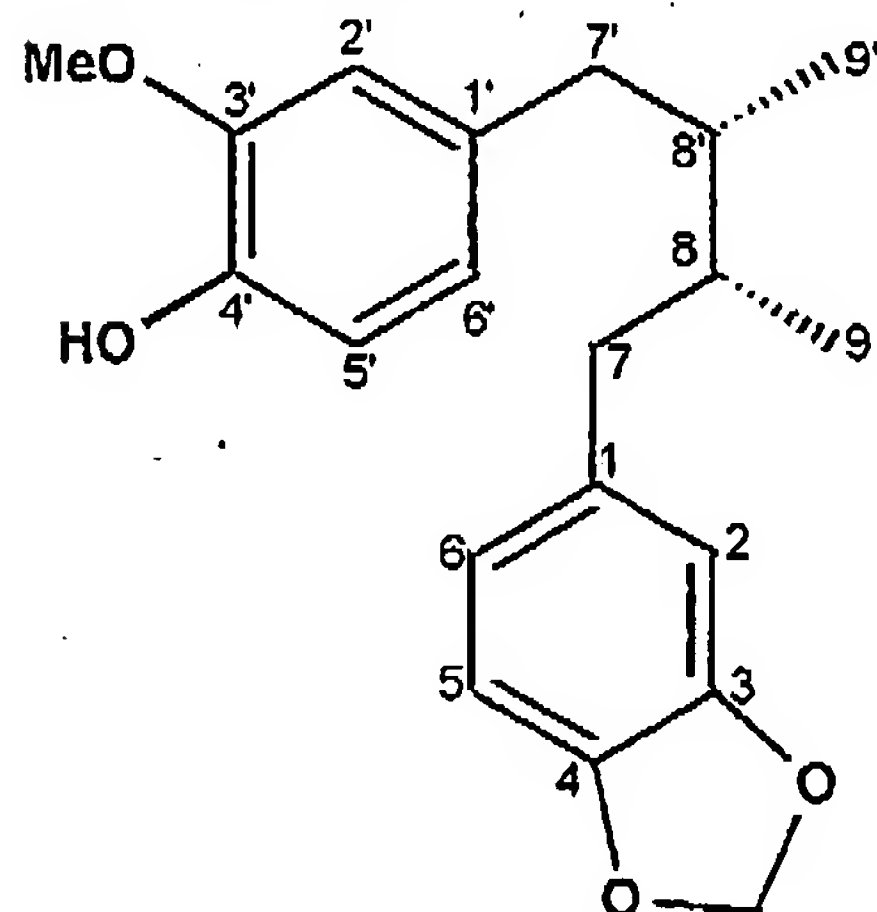
- [4] (Amended) A method for inhibiting the growth of acne-causing bacteria selected from the group consisting of *Propionibacterium acnes*, *Staphylococcus epidermis* and *Staphylococcus aureus*, the method comprising administering an effective amount of macelignan represented by Chemical formula 1 to a subject in need thereof.

[Chemical formula 1]



- [5] (Amended) A method for treating acne, comprising administering an effective amount of macelignan represented by Chemical formula 1 to a subject in need thereof.

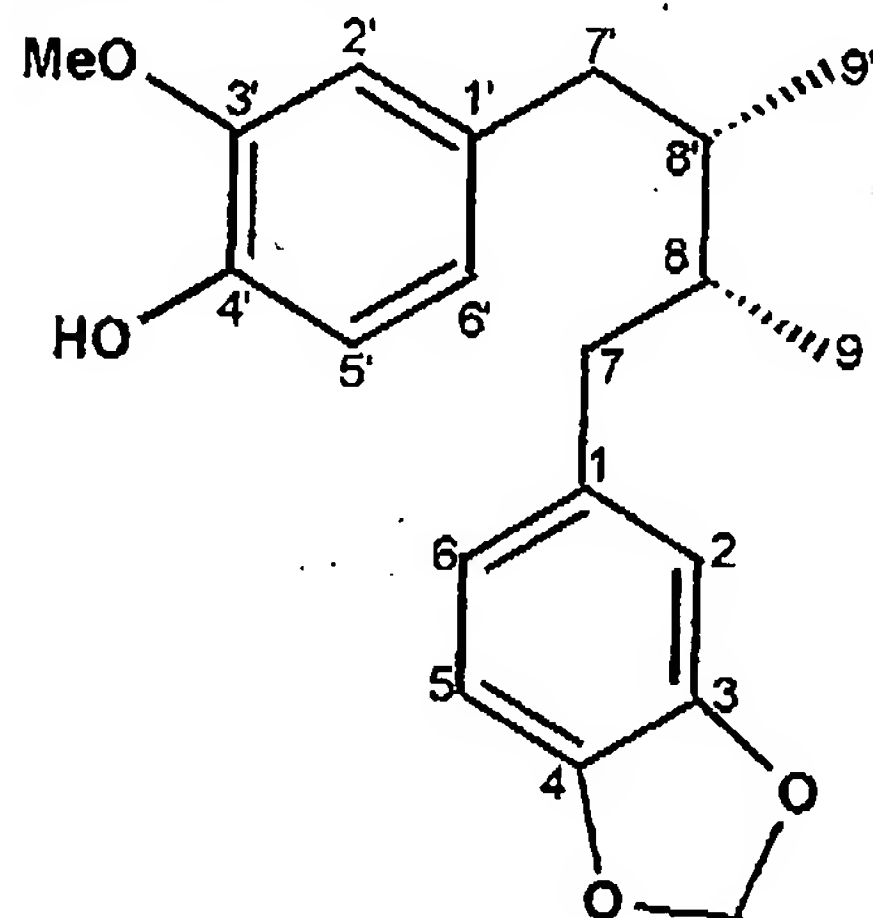
[Chemical formula 1]



- [6] (Cancelled)

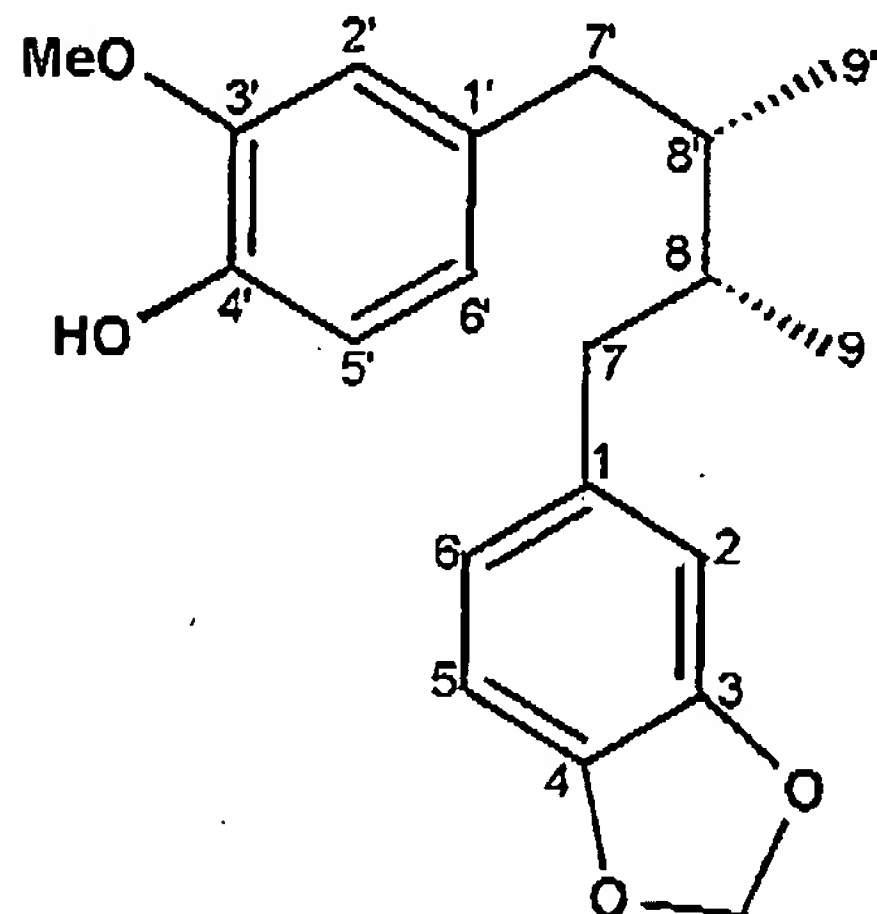
- [7] (Amended) Use of macelignan represented by Chemical formula 1 for preparing antibacterial agents against acne-causing bacteria selected from the group consisting of *Propionibacterium acnes*, *Staphylococcus epidermis* and *Staphylococcus aureus*.

[Chemical formula 1]



- [8] (Amended) Use of macelignan represented by Chemical Formula 1 for preparing acne treatment agents.

[Chemical formula 1]



- [9] (Cancelled)